PHILOSOPHICAL TRANSACTIONS.

Monday, *October* 21. 1667.

The Contents.

An Account

Of more Tryals of Transfuſion, *accompanied with ſome* Conſiderations *thereon, chiefly in reference to its circumſpect Practiſe on* Man; *together with a farther* Vindication *of this* Invention *from Uſurpers.*

THis Experiment, as it hath raiſed Diſputes among the *Curious* both here and abroad; ſo it hath put ſome of them upon conſidering ſuch ways, and given ſuch cautions, as may ren-

der the uſe of it ſafe and beneficial. Of the number of theſe ſeems to be that *French* Virtuoſo, *Gaſper de Gurye de Montpoly*, who in a late *Letter* of his to Monſieur *Bourdelot*, declares to the World, that this is a very Ingenious Invention, and ſuch an one, as may prove very uſeful; but withall, that, in his opinion, it is to be uſed with much caution, as not being like to be practiſed innoxiouſly, if imprudent men do mannage it, and the concourſe of two differing ſorts of Blood requiring many tryals, and a careful obſervation of many circumſtances, to give aſſurance. He ſuppoſes, that the Blood of every Animal is endowed with its peculiar Temper, and contains in the Aggregate of its parts, different natures, principles, figures, and even a different Center. Whence he concludes, that two Subſtances thus differing, and containing plenty of Spirits, are not reducible to one and the ſame Center, nor to one and the ſame Body without *Fermentation*; and that this Operation may prove of danger to him, that ſhall have admitted into his Veins a ſtrange Blood (wont to be free in its native Veſſels) without paſſing through thoſe degrees, that muſt give it Impreſſions ſutable to the temper and functions of the Vitals of the *Recipient:* And taking for granted, that no conſiderate man will hazard a *Total* Transfuſion, he acknowledges that a *Partial* one may be in ſome caſes and ſickneſſes very uſeful, provided, it be practiſed circumſpectly, upon a Body yet ſtrong enough, and in a *moderate* quantity, ſo as the Spirits and Blood of the *Recipient* may be able to diſſolve and maſter the transfuſed ſtrange Blood, and convert the ſame into its own nature by a gentle *Ebullition*; to obtain by ſuch a commixture a principle of motion, that may cauſe a better habit of Body. And he believes, that this Ebullition muſt always happen in Bloods of differing parts and qualities; and that very hardly two Animals, of differing ſpecies, ages and tempers, will be met with, that have Blood ſo like one another, as not to need *Fermentation*, to make a requiſit mixture. He doubts not, that if a ſubſtance could be found ſo reſembling that of our Spirits, as that it would immediately unite it ſelf with them, not needing any alteration, the Transfuſion of ſuch a Subſtance would be capable to produce effects little leſs than miraculous, by relieving the proſtrated forces

forces of Nature, and by fortifying in us the Spring of the motion and life: In a word, by exciting that Principle of continual Motion, which, whilſt it has ſtrength enough, ſtill ſubdues and gathers to it ſelf whatever is proper to entertain it, and rejects what is not ſo. But ſuch an Invention as this he ſees cauſe to eſteem very difficult, in regard that *different* Moulds cannot but Characterize things *differently*. Hence he proceeds to the Examples, wherein *Transfuſion* hath been experimented, even upon *Men*; alledged in that known ingenious Letter of Monſieur *Denys*. And here he intimates, how much he was pleaſed to learn, that, according to his Conjecture, a *Moderate* Intromiſſion of Blood hath well ſucceeded, and the *Fermentation*, which we foreſaw would be cauſed by the commixture of two Bloods, was made with advantage to the Patient: Which he judges did manifeſtly appear by his Bleeding at the Noſe, (a ſign of an *Ebullition* made in the Blood:) confirmed to him by this, that an expert Acquaintance of his, transfuſing a great quantity of Blood into ſeveral Doggs, obſerved always, that the *Receiving* Doggs piſſed Blood.

And as to the other ſucceſsful Experiment, made upon a healthy and robuſt man, he notes, that he being a luſty Fellow, ſtored with blood, and taking the Air, and working hard on the ſame day that the tryal was made upon him, his vigorous Blood, Spirits, and Conſtitution, and the ſtrong motion of his Heart, were able to convert into the ſubſtance of his own Blood that of the *Lamb* received, and to impart thereto his own nature, and to mould it into Figures ſutable to the pores where it was to paſs, and proper to the functions it was to perform.

But to theſe Reflections he ſubjoyns two other *Inſtances*, of an unlike ſucceſs; whereof the one is afforded by a *Man*, the other by a *Dogg*. As to the *Man*, it ought to be related beforehand, to prevent wonder or miſconſtruction, that his Inteſtines, when he was opened after death, were found to be gangren'd, and conſequently, that then he appeared to have been a ſubject altogether unfit for this Experiment, ſeeing it was naturally impoſſible for him to live with ſuch a putrefaction. But to come to the tryal it ſelf; this *Author* ſaith, that Baron *Bond*, Son to the firſt Miniſter of State to the King of *Sweeden*, undergoing the

Operation twice, appeared the firſt time to find new ſtrength by it; but expired ſoon after the ſecond Operation: *The Ebullition, it ſeems, of the corrupt Blood having maſtered and enervated all the Blood he had in his Body: which, when open'd, no Blood at all was found in his Heart: probably, as the *Anthor* conjecture th, upon this account, that there being not left in the *Patient* Blood enough of his own, nor ſtrength ſufficient to turn a ſtrange Blood into a ſubſtance homogenius to *that*; the Heart was not capable to admit the Blood of the *Emittent*, as conſiſting of parts diſproportionate to his own. But, as hath been already obſerved, his Entrails were altogether vitiated by a *Gangrene*, and he therefore out of the reach of being relieved by this Experiment.

*It were to be wiſhed the *Author* had expreſſed the Interval of time, wherein theſe two Operations followed one another; *that* ſeeming to be a material circumſtance in the Caſe.

Concerning the other *Inſtance*, *viz.* of the *Doggs*, the *Letter* affirms, that the Tryal was made by Monſieur *Gayen* with great exactneſs, after this manner. He drew three great diſhes of Blood from the Dog that was to receive, and weighed the other Dog that was to furniſh; and, the operation being perform'd, he weighed him again, and found him weigh leſs than he did by *two* pounds; of which having abated an *ounce* more or leſs, for the Urine, made by the Dog, and an *ounce* or *two* more for the Blood ſpilt in the Operation, there remaineth at leaſt *one* pound and a *half* of Blood, that was transfuſed. But, the *Recipient*, though well dreſs'd, and well fed, died *five* days after, the *Emittent* being yet alive. Whence it ſeems evident to this *Writer*, that the *too large* Intromiſſion of *new* Blood was predominant over the *Native*, and as 'twere, overwhelm'd it. Whence he again inculcates the dangerouſneſs of infuſing *too much* Blood at once, in regard that ſuch Blood being now ſeparated from the principle of life it had in the *Emittent*, and as yet deſtitute of the ſtamp neceſſary to live the life of the *Recipient*, it could not be moved and aſſimilated by the live Blood, which remained in the *Recipient*; and the *Fermentation*, that was made, paſſed rather to an Eagerneſs or Sowerneſs, than to ſuch an one as precedes Digeſtion. And this kind of eager acidity *he intimates* was ſeen by the Spectators, and felt by the Receiving Animal, which

which ſwounded, and remained as dead for half a quarter of an hour: And when ſome alledged, that the Dog died, becauſe he was wounded in the neck, where he could not lick himſelf, which rendred his wound incureable, anſwer was given, that Experiments had been made, wherein not only a Vein was opened, but alſo an Artery, yea, even the *Aſpera arteria* cut of a Dog, that could not lick himſelf, and yet ſurvived.

This whole Account is concluded with an Admonition, that all thoſe, who have conveniency, would make frequent and exact trials of this Experiment on *Brutes*, and carefully obſerve *Weight* and *Meaſure*, and all other circumſtances, before any thing be hazarded, that may damnify the publick, and depreciate the Invention.

Abundans cautela non nocet, is a Maxime very fit to be minded here; though ſeveral ſuccesful Experiments have been made in *London*, of very plentiful Transfuſions; and among others (to mention a ſignal one) that upon a *Bitch*, which loſt in the operation near 30 ounces of blood, and was recruited accordingly. This Animal does not only ſurvive to this very day, but had another more ſevere Experiment ſoon after tryed upon her, by which her *Spleen* was cut out, without tying up the Veſſels, whence that *viſcus* was ſeparated: Since which time (even before the wound was healed up) ſhe took dog, was with Puppy, and brought forth Whelps, and remains well and jocund, being kept for a piece of remarquable Curioſity in the Houſe of a Noble-man, that is as ſevere in Examining matters of fact, as he is able in Judging of their conſequences.

So that it is not too haſtily to be concluded, that *large* Transfuſions are dangerous; but rather frequent Experiments ſhould be made, before any thing be therein determined, with great as well as ſmaller quantities, both upon ſound and ſickly Beaſts, carefully obſerving, how either is endured in either, and what are the Effects following thereon.

Before we diſmiſs this *Subject*, ſomething is to be ſaid of the Cauſe, why the Curious in *England* make a demurr in practiſing this Experiment upon *Men*. The above-mentioned ingenious Monſieur *Denys* has acquainted the World, how this degree was ventured upon at *Paris*, and what good ſucceſs it there met with

with: And the *Journal des Scavans* glorieth, that the *French* have advanced this Invention ſo far, as to try it upon *Men*, before any *Engliſh* did it, and that with good ſucceſs.

We readily grant, *They* were the firſt, we know off, that actually thus *improved* the Experiment; but then they muſt give us leave to inform them of this Truth, that the Philoſophers in *England* had practiſed it long ago upon *Man*, if they had not been ſo tender in hazarding the Life of Man (which they take ſo much pain, to preſerve and relieve) nor ſo ſcrupulous to incur the Penalties of the Law, which in *England*, is more ſtrict and nice in caſes of this concernment, than thoſe of many other Nations are.

The *Publiſher* can aſſert *bonâ fide*, that ſeveral Moneths agoe he ſaw himſelf the *Inſtruments* ready, and heard the *Method* agreed on, thought proper to execute this Operation upon Man. And, for further proof thereof, he ſhall here inſert the whole way, peculiarly contrived here for this purpoſe, by the Ingenious Dr. *Edmund King*, and by him communicated in a Letter; Monſier *Denys* not having thought fit to deſcribe the *manner* they uſed in *France* for *Men*; nor any body elſe come to our knowledge.

The Letter is as follows,

SIR,

THe Method of Transfuſing Bloud you have ſeen practiſed, with facility enough, from Beaſt to Beaſt; and we have things in a readineſs to transfuſe Bloud from the Artery *of a* Lamb, Kid, *or what other Animal may be thought proper, into the* Vein *of a* Man. *We have been ready for this Experiment this ſix Months, and wait for nothing but good opportunities, and the removal of ſome conſiderations of a Moral nature. I gave you a view, you may remember, a good while agoe, of the Inſtruments, I think very proper for the Experiment, which are only a* Silver Tube, *with a* Silver Stopper *ſomewhat blunted at one end, and flatted at the other for conveniency of handling, uſed already upon Beaſts with good ſucceſs. The*

Way

way is in ſhort this. After the Artery is prepar'd in the Lamb, Kid, *&c. let a Ligature be made upon the* Arm, *&c. of a man (hard enough to render the Vein turgid;) in the place you intend to inſert the leſſer end of the Silver pipe, which is ſo fitted, that the Silver Stopper, thruſt into the Tube, reaches ſomewhat, by its blunt end, beyond one of the ends of that Tube. This done, divide the skin of the part in the ſame manner, that is uſed in cutting an* Iſſue, *juſt over the Vein, to be open'd. Then with a fine Lance open the Vein; or, if you pleaſe, in caſe the Vein lye fair and high (eſpecially if the skin be fine) you may open both together, according to the uſual way of letting Blood. Which done, let an Aſſiſtant clap his finger, or a little Boulſter, prepared before hand, or the like, upon the Vein a little below the Orfice, to hinder the Blood from aſcending. Keeping that poſition, inſert the blunt-ended Tupe upwards into the Vein; when 'tis in, hold it and the skin cloſe together between your finger and thubm. Then pull out of the Tube the Stopper, and inſert the Pipe, by which the Arterial Blood is to be infuſed from the* Emittent *Animal; managing the remainder according to the known Method of this Experiment.*

So far this Letter; which maketh the practicableneſs of this *Method* look ſo fair and eaſie, that nothing ſeems wanting to encourage the Trial, but the Direction and Aſſiſtance of diſcreet and skillful men, taking care, not to experiment it upon Subjects, that have their internal parts vitiated; for as much as it ſeems not reaſonable to expect, that this Transfuſion ſhould cure *Cacochymies*, or reſtore a depraved conſtitution of the *viſcera*.

We would have ſaid no more of this Argument at this time, were we not obliged to remove a miſtake found in one of the late *French* Journals, affirming with confidence, that 'tis *certain*, the

French

French have given the *Engliſh* the firſt *thought* or notion of this Experiment. And why? becauſe (*ſay they*) they are witneſſes, that a *Benedictine* Fryer, one Don *Robert de Gabets*, diſcourſed of it at Monſieur *de Monmors*, ten years agoe. Surely, all ingenius men will acknowledge, that the *certain* way of decidiug ſuch Controverſies as theſe, is a Publick Record, either written or printed, declaring the time and place of an Invention firſt propoſed, the contrivance of the Method, to practiſe it, and the inſtances of the ſucceſs in the Execution. All this appears in the field for *England*.

Numb. 7. of theſe *Tranſactions* (printed *An.* 1665. *in Decemb.* acquaints the World, how many years ſince Dr. *Chriſtopher Wren* propoſed the Experiment of *Infuſion* into Veins. And this was hint enough for the *R. Society*, ſome while after to advance *Infuſion* to *Tranſfuſion*; for the trial of which latter, they give order at their Publick Meeting of *May* 17. 1665. as may be ſeen in their *Journal*, where 'twas regiſtred by the care of their Secretaries obliged by Oath to fidelity: The trials proving *then* lame, for want of a fit *apparatus*, and a well contrived *Method* of operation, the Learned Phyſician and Expert Anatomiſt, Dr. *Lower*, ſince found out ſuch a Method, which is not only regiſtred in the ſame Book, but alſo publiſhed in Print *Numb.* 20. of theſe *Tracts*; before which time it had been already practiſed by the ſaid *Doctor* in *Oxford*, who was followed by ſeveral ingenious men at *London*, that ſucceſsfully practiſed it by the Publick Order of the aforeſaid *Society*.

It ſeems ſtrange, that ſo ſurprizing an Invention ſhould have been conceived in *France*, as they will have it, ten years ago, and lain there ſo long in the Womb, till the way of Midwiving it into the world was ſent thither from *London*: To ſay nothing of the diſagreement, there ſeems to be about the French *Parent* of this *fœtus*, Monſieur *de Gurye* in the Letter above mentioned, fathering it upon the *Abbot Bourdelot*, but the Author of the *French Journals*, upon a *Benedictine Fryer*.

But whoever this Parent be, that is not ſo material, as that all that lay claim to the Child, ſhould joyn together their endeavours and cares to breed it up for the ſervice and relief of humane life, if it be capable of it; and this is the main thing aimed at and ſollicited in this Diſcourſe; not written to offend or injure any,

any, but to give every one his due, as near as can be diſcerned by the *Publiſher*.

Anſwers

To ſome of the Inquires *formerly publiſh'd concerning Mines.*

THat the *Queries*, ſcattered up and down in theſe *Tracts*, may not ſeem loſt, or left un-regarded, the *Publiſher* intends to impart at convenient times ſuch of the Anſwers ſhall be ſent in by obſerving men, as may be thought acceptable to the *Reader*.

He begins now with an Account, communicated to him by the Learned and Inquiſitive Mr. *Joſeph Glanvil*, who premiſes in a *Letter*, that he procured the following *Anſwers* from a perſon living near the *Mendip*-Mines, and upon whoſe relations we may ſecurely depend: Adding, that he does not by theſe few ſuggeſtions think himſelf abſolved of his Taske, but ſhall purſue the matter farther, as ſoon as he has an opportunity of going into theſe Parts, whence he expects to be farther inform'd.

The *Reader* will be pleaſed to look back to the ſaid ſeveral *Queries*, as they are extant in the *Number* 19; the following *Anſwers* reſpecting thither, and being accommodated to the Mines of *Mendip* in *Somerſet-ſhire*, where the following Obſervations were made; *viz.*

To the 1, 2, 3 *Queries*. That all *Mendip* is Mountainous, yet the Hills not equal in height. That it is barren and cold, and rocky in ſome places. That the Ridges thereof run confuſedly, but moſt *Eaſt* and *Weſt*, and not in any *Parallel* one with another. That upon the *Surface* thereof it is Heathy, Ferny and Furzy; and the Cattel, it feeds, for the moſt part are Sheep, which go there all the year; and young Beaſts, Horſes and Colts at Spring and Fall. That the Sheep are not fair, but big-bellyed, and will grow to no bigneſs, after they have been there fed; but will grow fat, if they are removed into better ſoyle, and ſo their Beaſts and Horſes.

To the 4, 5, 6, 7 *Queries*. That the Natives and Inhabitants

 live